



Growatt 8000TL-US

Growatt 9000TL-US

Growatt 10000TL-US

Growatt 11000TL-US

Shenzhen Growatt New Energy Technology CO.,LTD

1st East & 3rd Floor, Jiayu Industrial Zone, Xibianling, Shangwu Village,
Shiyan, Baoan District, Shenzhen, P.R.China

T + 86 755 2747 1942

F + 86 755 2747 2131

E info@ginverter.com

W www.growatt.com

Table of contents

1 Information in this document

- 1.1 Validity
- 1.2 Target Group
- 1.3 Additional information
- 1.4 Warnings on this document
- 1.5 Markings on this product
- 1.6 Glossary

2 Safety

- 2.1 General installation warnings
- 2.2 Assembly Warnings
- 2.3 Electrical Connection Warnings
- 2.4 Operation Warnings
- 2.5 Intended use

3 Product Description

- 3.1 Growatt TL-US
- 3.2 Type label

4 Unpacking

5 Installation

- 5.1 Safety instructions
- 5.2 Selecting the Installation Location
- 5.3 Mounting the Growatt TL-US
- 5.4 Electrical Connection

6 Commissioning

- 6.1 Operation checking on the Growatt TL-US
- 6.2 Display and message
- 6.3 Monitoring the inverters

7 Cleaning and Care

- 7.1 Checking the inverter
- 7.2 Checking the DC Disconnect
- 7.3 Cleaning the Inverter
- 7.4 Cleaning the Fan Guards

8 Decommissioning

- 8.1 Dismantling the Growatt TL-US
- 8.2 Packaging the Growatt TL-US
- 8.3 Storage
- 8.4 Disposal

9 Trouble Shooting

- 9.1 Warnings
- 9.2 Errors

10 Growatt Factory Warranty

11 Specification

12 Spare Parts and Accessories

13 Contact

1.1 Validity

This manual describes the assembly, installation, commissioning and maintenance of the following Growatt Inverters:

Growatt 8000TL-US
Growatt 9000TL-US
Growatt 10000TL-US
Growatt 11000TL-US

This manual does not cover any details concerning equipment connected to the Growatt TL-US (e.g. PV modules). Information concerning the connected equipment is available from the manufacturer of the equipment.

1.2 Target Group



CAUTION

This manual is for qualified personnel. Qualified personnel have received training and have demonstrated skills and knowledge in the construction and operation of this device. Qualified personnel are trained to deal with the dangers and hazards involved in installing electric devices.






1.3 Additional information

Find further information on special topics in the download area at www.ginverter.com

1.4 Warnings on this document

| Symbol | description |
|-------------|--|
| DANGER | DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury. |
| WARNING | WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury. |
| CAUTION | CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. |
| NOTICE | NOTICE is used to address practices not related to personal injury. |

1.5 Markings on this product

| Symbol | description |
|---|--|
|  | Warning regarding dangerous voltage The product works with high voltage. All work on the product must only be performed as described in its documentation. |
|  | Beware of hot surface The product can become hot during operation. Do not touch the product during operation |
|  | Observe the operating instructions Read the product's documentation before working on it. Follow all safety precautions and instructions as described in the documentation. |
|  | FCC certificate |
|  | UL1741 Standard for Safety for Inverters, Converters, Controllers and Interconnection System Equipment for use with Distributed Energy Resources. CSA CSA-C22.2 No. 107.1-01 - General Use Power Supplies. |

1.6 Glossary

AC

Abbreviation of "Alternating Current".

DC

Abbreviation of "Direct Current".

Energy

Energy is measured in Wh (watt hours), kWh (kilowatt hours) or MWh (megawatt hours). The energy is the power calculated over time. If, for example, your inverter operates at a constant power of 20,000 W for half an hour and then at a constant power of 10,000 W for another half an hour, it has fed 15,000Wh of energy into the power distribution grid within that hour.

Power

Power is measured in W (watts), kW (kilowatts) or MW (megawatts). Power is an instantaneous value. It displays the power your inverter is currently feeding into the power distribution grid.

Power rate

Power rate is the ratio of current power feeding into the power distribution grid and the maximum power of the inverter that can feed into the power distribution grid.

Power factor

Power factor is the ratio of true power or watts to apparent power or volt amps. They are identical only when current and voltage are in phase than the power factor is 1.0. The power in an ac circuit is very seldom equal to the direct product of the volts and amperes. In order to find the power of a single phase ac circuit the product of volts and amperes must be multiplied by the power factor.

PV


Abbreviation of photovoltaic

Wireless communication(opt)


The internal wireless communication technology is a radio technology that allows the inverter and other communication products to communicate with each other. The internal wireless communication does not require line of sight between the devices and it is selective purchasing.

2 Safety


1.4 General installation warnings

| | |
|--|--|
|  WARNING | <p>➤ The GROWATT TL-US Inverters is designed and tested according to international safety requirements; however, certain safety precautions must be observed when installing and operating this inverter. Read and follow all instructions, cautions and warnings in this installation manual. If questions arise, please contact technical services at +86 (0)755 2747 1900.</p> |
| | <p>➤ All operations regarding transport, installation and start-up, including maintenance must be carried out by qualified, trained personnel and in compliance with all prevailing local codes and regulations.</p> |
| | <p>➤ This grid-tied inverter system operates only when properly connected to the AC -distribution network. Before connecting the services of Growatt TL-US to the power distribution grid, contact the local power distribution grid company. This connection must be made only by qualified technical personnel to connect, and only after receiving appropriate approvals, as required by the local authority having jurisdiction.</p> |
| | <p>➤ In order to minimize the potential of a shock hazard due to hazardous voltages, cover the entire solar array with dark material prior to connecting the array to any equipment.</p> |
| | <p>➤ The Growatt TL-US inverter is designed and tested according to international safety requirements (UL 1741/IEEE 1547), but as with all electrical and electronic equipment, certain precautions must be observed and followed during installation.</p> |
| | <p>Keep this documentation in the immediate vicinity of the Growatt TL-US Inverter. It must be accessible for approved technical service and maintenance personal at any time.</p> |
| | <p>➤ Basic safety rules require using qualified and trained personnel possessing the skills necessary for assembly, mounting, start-up and operation of the product.</p> |


2.2 Assembly Warnings

| | |
|--|--|
|  WARNING | <p>➤ Prior to installation, inspect the unit to ensure absence of any transport or handling damage, which could affect insulation integrity or safety clearances; failure to do so could result in safety hazards.</p> |
| | <p>➤ Assemble the inverter per the instructions in this manual. Use care when choosing installation location and adhere to specified cooling requirements.</p> |
| | <p>➤ Unauthorized removal of necessary protections, improper use, incorrect installation and operation may lead to serious safety and shock hazards and/or equipment damage.</p> |

2.3 Electrical Connection Warnings

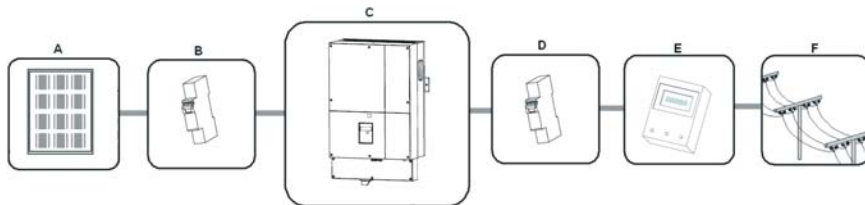
| | |
|--|--|
|  WARNING | <p>➤ Make all electrical connections (e.g. conductor termination, fuses, PE connection, etc.) in accordance with prevailing regulations. When working with the inverter powered on, adhere to all prevailing safety regulations to minimize risk of accidents.</p> |
| | <p>➤ Systems with inverters typically require additional control (e.g., switches, disconnects) or protective devices (e.g., fusing circuit breakers) depending upon the prevailing safety rules.</p> |
| | <p>➤ The components in the inverter are live. Touching live components can result in serious injury or death.</p> <ul style="list-style-type: none"> • Do not open the inverter expect the wire box by qualified persons. • Electrical installation, repairs and conversions may only be carried out by electrically qualified persons. • Do not touch damaged inverters. |

2.4 Operation Warnings

| | |
|---|--|
|  WARNING | <p>➤ Anytime the inverter has been disconnected from the power network, use extreme caution as some components can retain charge sufficient to create a shock hazard; to minimize occurrence of such conditions, comply with all corresponding safety symbols and markings present on the unit and in this manual.</p> |
| | <p>➤ Ensure all covers and doors are closed and secure during operation.</p> |
| | <p>➤ All operations regarding transport, installation and start-up, including maintenance must be by qualified, trained personnel and in compliance with all prevailing codes and regulations.</p> |
| | <p>➤ Although designed to meet all safety requirements, some parts and surfaces of Inverter are still hot during operation. To reduce the risk of injury, do not touch the heat sink at the back of the PV-Inverter or nearby surfaces while Inverter is operating.</p> |
| | <p>➤ Incorrect sizing of the PV plant may result in voltages being present which could destroy the inverter. The inverter display will read the error message "PV-Overvoltage!"</p> <ul style="list-style-type: none"> • Turn the rotary switch of the DC Disconnect to the Off position immediately. • Contact installer. |

2.5 Intended use

The Growatt TL-US is a PV inverter which converts the direct current of the PV array to alternating current and feeds it into the power distribution grid.

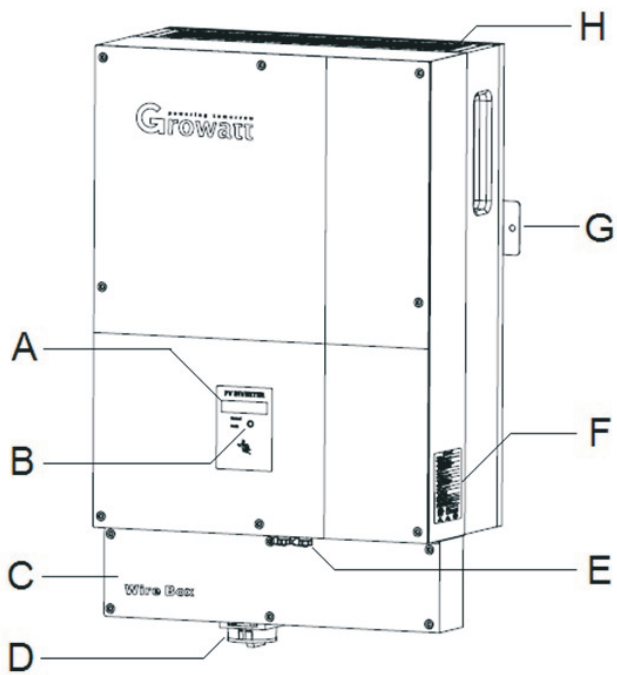


| Position | Description |
|----------|-------------------------|
| A | PV modules |
| B | DC load circuit breaker |
| C | Growatt TL-US Inverter |
| D | AC load circuit breaker |
| E | Energy meter |
| F | Utility grid |

The Growatt TL-US inverter may only be operated with PV arrays (modules and cabling) that have protective insulation. The PV modules used must be suitable for use with the Growatt TL-US and must be approved by the module manufacturer. Do not connect any energy sources other than PV modules to the Growatt TL-US inverter.

3 Product Description

Growatt TL-US



| Item | Description |
|------|--------------------|
| A | LCD |
| B | LED |
| C | Wire box |
| D | DC Switch |
| E | Rs485 connector |
| F | Type label |
| G | Safety-lock flange |
| H | Fan air windows |

Symbol on the inverter

| Symbol | Description | Explanation |
|------------------|------------------------|--|
| | Tap symbol | Indicates display operation (see Section 6.2). |
| NORMALL FAULT | Inverter status symbol | Indicates inverter operation status |

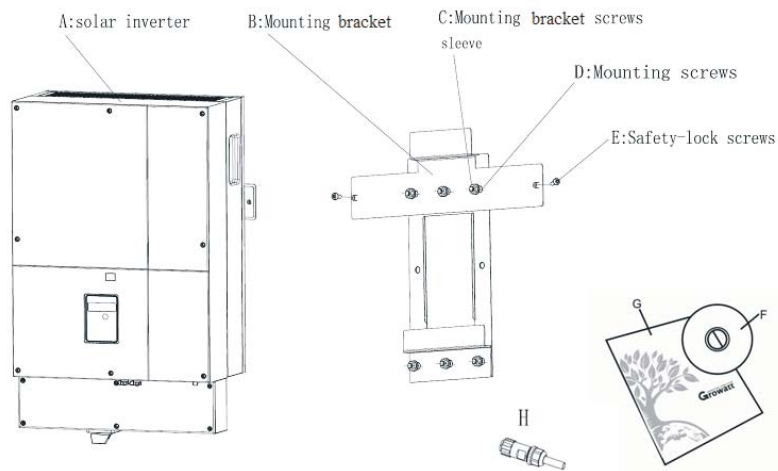
3.1 Type label

The type labels provide a unique identification of the inverter (The type of product, Device-specific characteristics, Certificates and approvals). The type labels are on the right-hand side of the enclosure.

| |
|--|
| GROWATT PV Grid Inverter |
| Model Name: GROWATT XXXXXTL-US |
| Range of input voltage: XXX ~ XXX Vdc@208V XXX ~ XXX Vdc@240V |
| MPPT range of input voltage: XXX ~ XXX Vdc@208V XXX ~ XXX Vdc@240V |
| Max. input current of MPP tracker : XXXAdc |
| Max. input short circuit current : XXXAdc |
| Nominal output power: XXXVA |
| Default grid voltage setting: XXXVac/XXXVac |
| Range of grid voltage: XXX ~ XXX Vac@208V XXX ~ XXX Vac@240V |
| Nominal grid frequency : 60Hz |
| Range of grid frequency : 59.3~60.5Hz |
| Max. output current: XXX Aac@208V XXXAac@240V |
| Max. output overcurrent protection : XXXAac@208V XXXAac@240V |
| Output power factor : >0.99 |
| Enclosure: Type 3R |
| Operation Ambient Temperature: -25~+60°C(Power derating above 45°C) |
| Conforms to UL STD.1741 Certified to CSA STD.C22.2 No.107.1 |
| |
| |

4 Unpacking

After opening the package, please check the contents of the box. It should contain the following:



| Item | Name | Quantity |
|------|-----------------------------------|-------------|
| A | Solar inverter | 1 |
| B | Mounting | 1 |
| C | Mounting frame screws sleeve | 6 |
| D | Mounting screws | 6 |
| E | Safety-lock screws | 2 |
| F | Monitor software(disk) | 1(Optional) |
| G | Use Manual and Installation Guide | 1 |
| H | RS 485 connectors | 2 |

Installation 5

5.1 Safety instructions

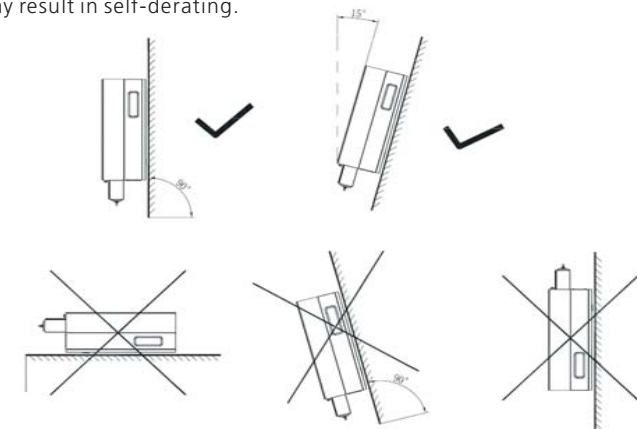


Before instructions, anyone includes qualified, trained personnel, must make sure you have to read the section 2.1, about the General installation warnings.

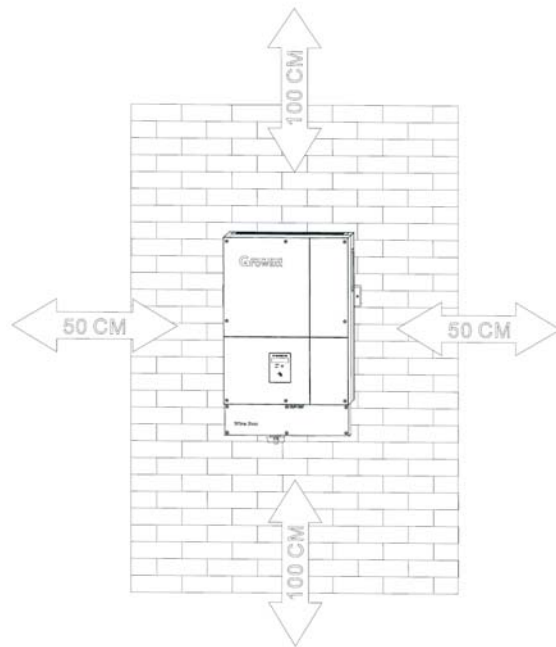
5.2 Selecting the Installation Location

Select the installation location based on the following considerations:

- 1) Select a well-ventilated location sheltered from direct sun radiation.
- 2) Choose a location that allows unobstructed airflow around the inverter.
- 3) Allow sufficient room around the inverter to enable easy installation and removal from the mounting surface.
- 4) Height from ground level should be such that the display and status LED are easy to read.
- 5) Access panels on the front surface of the inverter allow inspection and maintenance of hardware; and must not be blocked. The following Figure shows the recommended minimum clearances around the inverter.
- 6) When possible, mount the Growatt TL-US Inverter vertically. For other mounting orientations consult with Growatt.
- 7) Tilted mounting (15° from vertical) is acceptable, but will reduce heat dissipation and may result in self-derating.



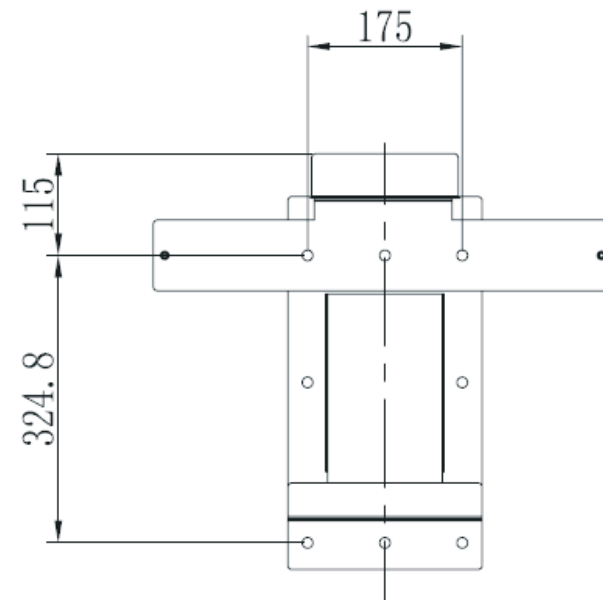
- 8) Inverter requires adequate cooling space, allowing at least 100CM space above and below the inverter while 50cm space of right and left.



- 8) Inverter requires adequate cooling space, allowing at least 100CM space above and below the inverter while 50cm space of right and left.
- 9) The installation method and mounting location must be suitable for the weight and dimensions of the inverter. Select a wall or solid vertical surface that can support the PV-Inverter.
- 10) The location shall be away from strong electromagnetic interference.
- 11) Be sure that the inverter is out of the children's reach.
- 12) Don't put any things on the inverter. Do not cover the inverter.
- 13) Do not install the inverter near television antenna or any other antennas and antenna cables.
- 14) The inverter can't install to solarization, drench, firm location. We suggest that the inverters should be installed at the location with some cover or protection.

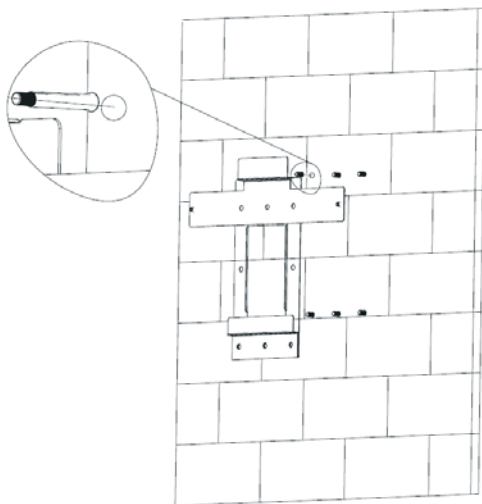
5. 3 Mounting the Growatt TL-US

Dimensions of the mounting bracket



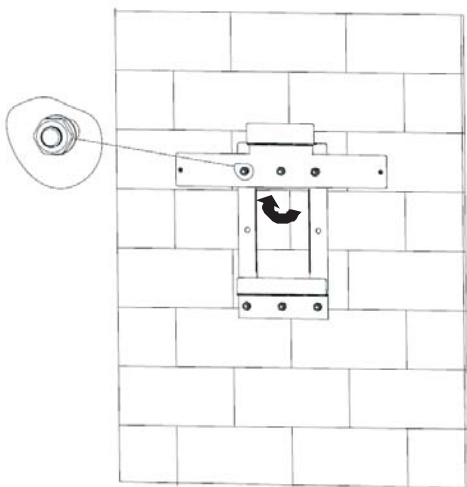
➤ Step 1: Drilling 6 holes!

Using the mounting bracket as a template and drill 6 holes as illustrated in image, then insert 6 explosion bolts into the holes, make sure the bolts paralleled with the outer surface of the bracket.



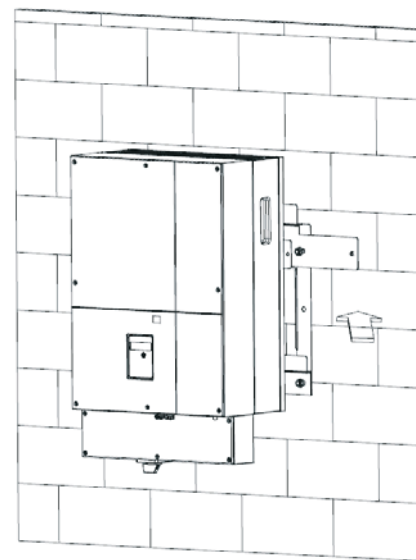
➤ Step 2: Mounting the bracket!

Mounting the bracket onto the wall and screw on the nuts to fasten the bracket, as the figure below.



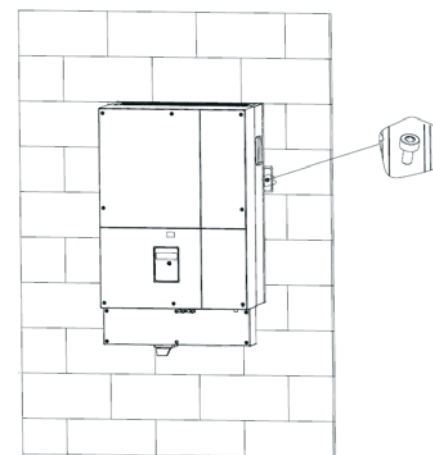
➤ Step 3: Mounting the inverter on the wall

Rise up the Growatt TL-US a little higher than the bracket. as figure below. Hang the inverter on the mounting bracket



➤ Step 4: Insert safety-lock screws!

Insert safety-lock screws into the two side holes of the mounting bracket to fasten the inverter, as the figure below.



➤ Step5:Check!

Check the upper straps of PV Inverter and ensure it fits on to the bracket.
Check the secure mounting of the PV Inverter by trying to raise it from the bottom.
The PV Inverter should remain firmly attached.

➤ The Growatt TL-US is mounted.

5.4 Electrical Connection

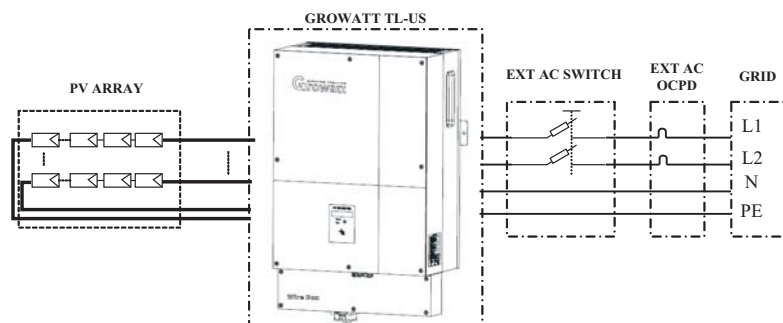
5.4.1 Safety



Before instructions, anyone includes qualified, trained personnel, must make sure you have to read the section 2.3, about the General installation warnings.

All electrical installations must be done in accordance with all local electrical codes and the NATIOAL Electrical Code®, ANSI/NFPA 70. For installation in Canada the installations must be done in accordance with applicable Canadian standards. Before connecting the inverter to the power distribution grid, contact your local electric utility company. This connection may be made only by electrically qualified persons.

5.4.2 Wiring Diagram with Over-Current Protection Device and AC Disconnect



- AC disconnect switch: 2-Pole, Voltage and current rating depends on the grid connection voltage and output power of the inverter being installed.
- Over-Current Protection Device: fusing or circuit breaker - between inverter and grid. Circuit breaker must be rated for bidirectional current flow. Rating of OCPD is dependent on specific grid connection.

5.4.3 Grounding

AC Grounding

The Growatt TL-US must be connected to the AC grounding conductor of the power distribution grid via the ground terminal (PE).

The AC input and AC output circuits are isolated from the enclosure and system grounding, if required by Section 250 of the National Electrical Code, ANSI/NFPA 70, is the responsibility of the installer. By Section 250 of the National Electrical Code, ANSI/NFPA 70, is the responsibility of the installer.

PV Grounding

The Photovoltaic System Grounding shall be installed per the requirements of Sections 690.41 through 690.47 of the National Electrical Code, ANSI/NFPA 70 and is the responsibility of the installer.

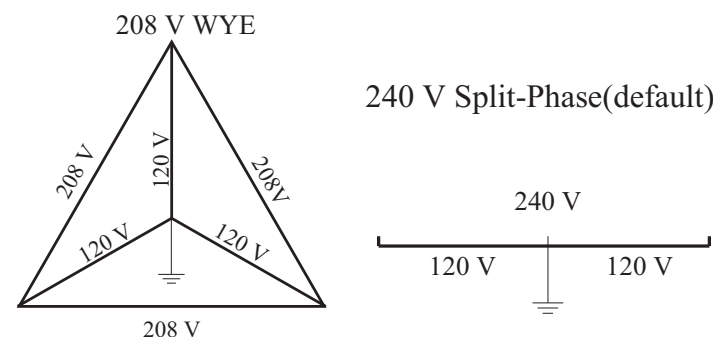
The grounding conductor in the framework of the PV array must be connected to the PV grounding conductor and the DC grounding conductor. The cross-section of the grounding conductor corresponds to the cross-section of the largest conductor in the DC system.

DC Grounding Conductor

A DC grounding conductor may be required by the Authority Having Jurisdiction (AHJ). Use the terminal block for the PV grounding conductor and DC grounding conductor.

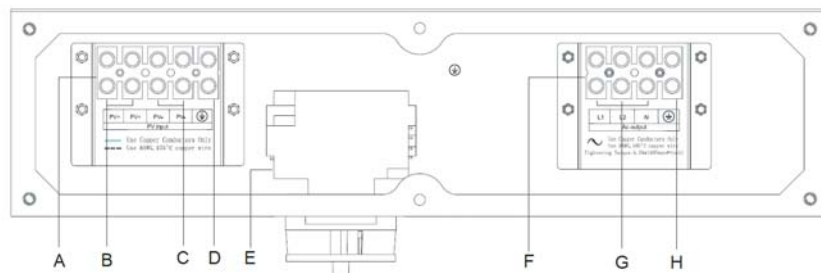
5.4.4 GRID Type

Based on the local GRID standards, it may select different connection types. The available configurations are shown as below:



Policies vary from one utility company to another. Consult with a representative of the local utility company before designing and installing a PV system.

5.4.5 Growatt TL-US Wire Box



| Item | Detail | |
|------|---------------------|------------------------|
| A | DC input terminals | 5 POLES |
| B | PV+ | 2 POLES |
| C | PV- | 2 POLES |
| D | DC Grounding | For PV array Grounding |
| E | DC Switch | 50A/600V |
| F | AC output terminals | 4 POLES |
| G | AC output | L1/L2/N |
| H | AC Grounding | Grid Grounding |

5.4.6 AC cable requirements

The cable must be dimensioned in accordance with the local and national directives for the dimensioning of cables. The requirements for the minimum conductor cross-section derive from these directives. Influencing factors for cable dimensioning are, among others, the following: nominal AC current, type of cable, cable length, routing method, cable bundling, ambient temperature and maximum desired line losses.

Ambient temperature

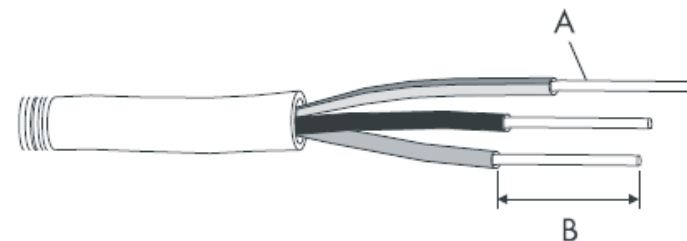
The higher the ambient temperature is, the higher the power losses.

Use cables with large cable cross-sections in installation sites with high ambient temperatures.

Routing method

The cables heat up during operation. If there are several cables in a conduit, the temperature of all cables increases.

Use cables with a large cross-section if you lay several cables in one conduit.



| Code | Name | Detail |
|------|-------------------------|--|
| A | Conductor cross-section | See the Conductor cross section in the flowing chart |
| B | Stripping insulation | 12mm |


The details of AC conductor cross-section for every pole) are shown in the following table.

| Model | Conductor cross section |
|--------------------|---|
| Growatt 8000TL-US | #8~#6AWG(8.37~13.3mm ²), 194°F (90°C) |
| Growatt 9000TL-US | #8~#6AWG(8.37~13.3mm ²), 194°F (90°C) |
| Growatt 10000TL-US | #8~#6AWG(8.37~13.3mm ²), 194°F (90°C) |
| Growatt 11000TL-US | #8~#6AWG(8.37~13.3mm ²), 194°F (90°C) |

5.4.7 Connecting the AC cable in the Wire box



Before connecting, make sure the AC cable is disconnected to the Unity from the AC breaker.
DO NOT power connecting!

1. Open the wire box of the Growatt TL-US.
2. Knock off the plugs on the wire box.
3. Installation rubber water joint instead of the plugs.
4. Push the cable through the water joint into the wire box.
5. Connect the AC device grounding green-yellow cable to the PE terminal labeled .
6. Connect the Neutral cable to the terminal labeled N.
7. Connect the phase one cable to the terminal labeled L1.
8. Connect the phase two cable to the terminal labeled L2.
9. Tighten the cables with a torque of 40 in-lb. (4.5 Nm).
10. Check that all terminals have the correct wiring and that the cables are secure.
11. Tighten to seal the water joint.



➤ The AC cables are connected in the wire box.

5.4.8 DC cable requirements

The details of DC conductor cross-section for every pole) are shown in the following table.

| Model | Conductor cross section |
|--------------------|---|
| Growatt 8000TL-US | #10~#6AWG(5.26~13.3mm ²),194°F (90°C) |
| Growatt 9000TL-US | #10~#6AWG(5.26~13.3mm ²),194°F (90°C) |
| Growatt 10000TL-US | #10~#6AWG(5.26~13.3mm ²),194°F (90°C) |
| Growatt 11000TL-US | #10~#6AWG(5.26~13.3mm ²),194°F (90°C) |


5.4.9 Connecting the DC cable in the Wire box

| | |
|--|---|
|  DANGER | <p>High voltages on PV modules that are exposed to light</p> <ul style="list-style-type: none">• Risk of death due to electric shock from touching a DC conductor.• Do not touch the DC conductor. <p>High voltages in the DC cables</p> <ul style="list-style-type: none">• Risk of death or serious injury from touching a DC cable.• Only connect the DC cable from the PV module to the inverter as described in this manual. |
|  WARNING | <p>Before connecting, make sure the DC switch in the wire box is turned off and measure the voltage to ensure the array output is non-hazardous. Danger of burning due to overheating</p> <ul style="list-style-type: none">• Observe the National Electrical Code® 2008, Section 690.35 |

1. Knock off the plugs on the wire box.
2. Installation rubber water joint instead of the plugs.
3. Push the cable through the water joint into the wire box.
4. Open the screw terminals completely by turning them counterclockwise using a flat-head screwdriver.
5. Connect the grounding cable of the PV frame to the PE terminal labeled
6. Connect the positive DC cable to the terminal labeled PV+
7. Connect the negative DC cable to the terminal labeled PV-
8. Tighten all cables in the terminal blocks in the wire box with a torque of 40 in-lb. (4.5 Nm).
9. Verify that all connections are correctly cabled and tightened to the correct torque. Pull on the cable in order to make sure that it is attached tightly enough in the terminal.
10. Tighten to seal the water joint.
11. Close the wire box.

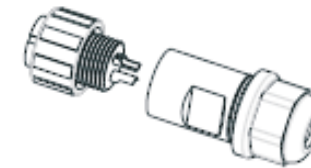
➤ The DC cables are connected in the wire box.

5.4.10 RS485 cable connection

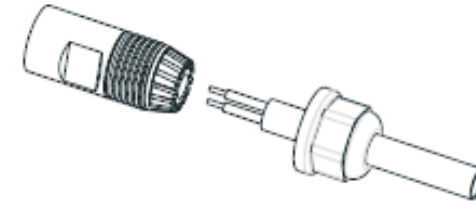
| | |
|---|--|
|  NOTICE | The RS485 port have two types of installation mode, Please choice the corresponding installation instructions! |
|---|--|

RS 485 port type1:

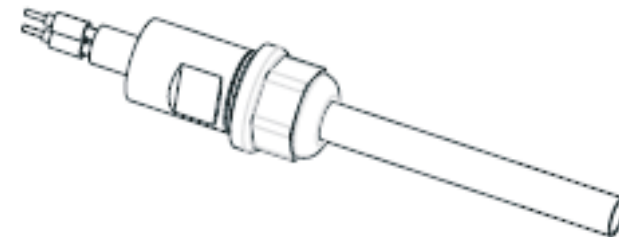
1. Unscrew the plastic connector.



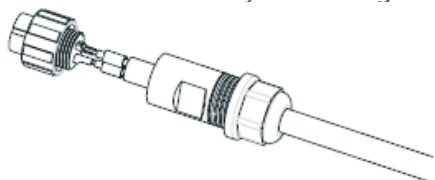
2. Make the RS485 cable go through the connector.



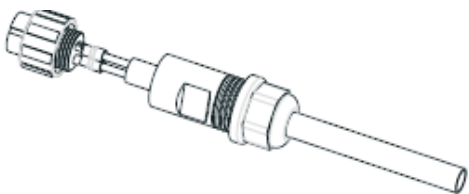
3. Put two heat shrink tubes onto the front head of RS485 cable.



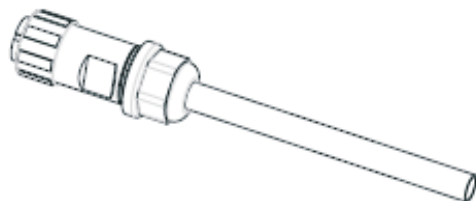
4. Insert the two metal head into relevant small cupreous hole, and fasten the connection by soldering



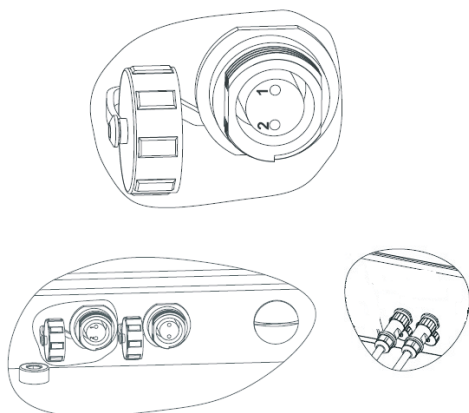
5. Make the heat shrink tubes wrap the joint.



6. Assemble the connector.



7. Connect the RS485 connector onto the inverter. Make sure the connection matched ('1' to '1', '2' to '2').



| | |
|-------------|--|
| DANGER | <p>High voltages in the PV system Risk of death or serious injury due to electric shock.</p> <ul style="list-style-type: none"> Only electrically skilled persons may perform work on the PV array. |
| WARNING | <ul style="list-style-type: none"> Under any condition! Make sure the maximum open circuit voltage (Voc) of each PV string is less than 600VDC. |

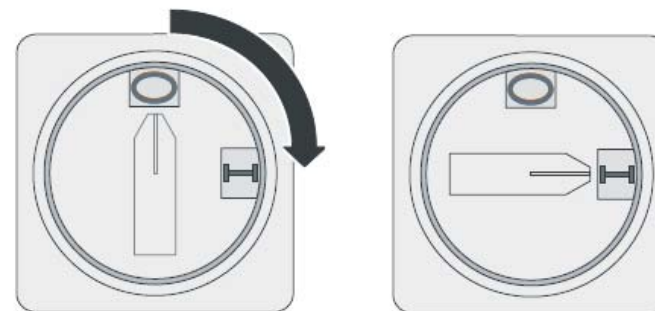
Requirements

- The AC cable is correctly connected.
- The DC cable is correctly connected.

6.1 Operation checking on the Growatt TL-US

About the LCD and LED, you can refer to the next section 6.2 for details.

1. Remove all covers from the PV array.
2. Switch on the AC breaker.
2. Turn the DC Disconnect to position "I".



4. If the PV input voltage is above 110V, Growatt TL-US starts up. Inverter displays information as shown in the flow chart as follow:

```

Module: xxxxxx
SerNo: xxxxxxxxxx
FW Version: x.x.x
Connect in: xxS
Connect : OK
Power: xxxx.xW
    
```

- If the PV voltage input is lower than 360V, the Growatt TL-US will work in a standby status. If the PV voltage is higher than 360V, the Growatt TL-US will work in a normal status. So you can check the input and output information as well as the status of the Growatt TL-US on the LCD.
- Once the Growatt TL-US is working in a normal status, before connect to the grid, it will take 60 seconds to check the inverter include the GFCI automatically.
- When it counts to 0s, the inverter begins to connect to the grid. Once it feeds to the grid successfully, LCD display "Connect OK" and the LED turns to green.

► The Growatt TL-US feeds to the grid successfully!

6.2 Display and message

6.2.1 Setting the LCD display

The inverter can support three kinds of knock: single knock, double knock and thrice knock. Each kind of knock has different function. Refer to specified definition in Table below:

| Knock type | Definition |
|--------------|--------------|
| Single knock | KeyDown |
| Double knock | KeySET |
| Thrice knock | KeyEnter&ESC |

When the LCD is dark, Knock and double knock make it becomes bright. Knock to make it display next information or change the set situation. Double knock make the display stand for 30 second and enter setting menu

- Setting language**
Knock to make the display bright→ knock to "set language"→double knock to enter "language: English"→knock to select the language you need and Thrice knock to enter or wait until the display become dark.
- Setting communication address**
Knock to make the display bright→ knock to "COM Address: xx" →double knock to change the Address model→ knock to set address, Thrice knock to enter.
- Setting grid model choice**
Knock to make the display bright→ knock to "Set Grid Model" →double knock to enter "Net Model: xx"→knock to select the grid model you need and Thrice knock to enter or wait until the display become dark

Power: 10000.0W
Net Model : 1

for 208V WYE

Power: 10000.0W
Net Model : 2

for 240V Split-phase

6.2.2 LCD display and message

To save power, the LCD's backlight automatically turns off after 30 seconds. The display on the LCD can be control by Knock on the front.

The first line will show some status of the inverter, there are 4 status listed in below table

| The First Line Of LCD | | |
|-----------------------|------------------|--------------------------|
| STATE | DISPLAY CONTENT | REMARK |
| Wait State | Standby | PV voltage low |
| | Waiting | Initial waiting |
| | Connect in xxS | System checking |
| | Reconnect in xxS | System checking |
| Inverter State | Connect OK | Connect to Grid |
| | Power: xxxx.xW | Inverter watt at working |
| Fault State | Error: xxx | System Fault |
| Program State | Programming | Update Software |

While Growatt inverter is working, the first line will normally show Power status:

The Second line can change by knock on

| The Second Line Of LCD (just for example) | | |
|---|----------------|------------------|
| CYCLE DISPLAY | DISPLAY TIME/S | REMARK |
| Power: 10000.0W Etoday: 900.0kWh | 4 | The energy today |
| Power: 10000.0W Eall: 1000KWH | 4 | The energy al |
| Power: 10000.0W PV: 420V | 4 | The PV Voltage |

| | | |
|-------------------------------------|---|-------------------------------------|
| Power: 10000.0W AC:240V F:60.0Hz | 4 | The AC Voltage & Frequency |
| Power: 10000.0W SerNo:0000000000 | 4 | The Serial Number |
| Power: 10000.0W Model:GTLB00F142 | 4 | The inverter model |
| Power: 10000.0W FW Version:LB1.0 | 4 | The software version |
| Power: 10000.0W Set Language | 4 | Set Language |
| Power: 10000.0W COM Address: 001 | 4 | Set Communications Address |
| Power: 10000.0W RS232 | 4 | Set Communication Type(opt) |
| Power: 10000.0W 2013/07/19 10:00 | 4 | Set year/month/day/time |
| Power: 10000.0W Phase Select | 4 | Select phase for power balance(opt) |
| Power: 10000.0W PowerBalancer | 4 | Set Power balance mode(opt) |
| Power: 10000.0W Set Grid Model | 4 | Set Grid Model |

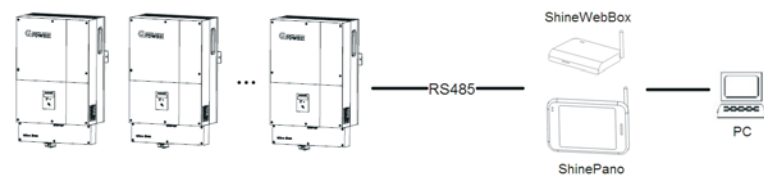
6.3 Monitoring the inverters

The inverter provides RS485 interface and RS232(opt) interface to communicate with remote PC or logger. User can monitor the inverter's state via the following types of communication systems.

➤ Through RS485 interface-Data logger



➤ Through RS485 interface-Data logger+ PC



➤ Through RS485 interface-RS485-232 converter+ PC



7 Cleaning and Care

7.1 Checking the inverter

- Ask the installer to check for correct inverter operation at regular intervals.
- Check whether there is any externally visible damage to the inverter.

If there is any externally visible damage to the inverter, contact the installer.

7.2 Checking the DC Disconnect

Check for externally visible damage and discoloration of the DC Disconnect and the cables at regular intervals.

If there is any visible damage to the DC Disconnect, or visible discoloration or damage to the cables, contact the installer.

- Once a year, turn the rotary switch of the DC Disconnect from the On position to the Off position 5 times in succession. This cleans the contacts of the rotary switch and prolongs the electrical endurance of the DC Disconnect.



7.3 Cleaning the Inverter

If the inverter is dirty, clean the enclosure lid, the display, and the LEDs using only clean water and a cloth. Do not use any cleaning agents (e.g. solvents or abrasives).

7.4 Cleaning the Fan Guards

- Check whether the fan guards are dusty or dirt-clogged.
- If the fan guards are dusty, clean them with a vacuum cleaner.

8 Decommissioning

8.1 Dismantling the Growatt TL-US

- 1) Open the wire box of the Growatt TL-US.
- 2) Remove all cables connected to the wire box.
- 3) Close the wire box.

- 4)  CAUTION

The Growatt TL-US may fall down due to inappropriate disassembly.

Contusions or bone fractures due to the heavy weight of the Growatt TL-US.

- Prior to disassembling the Growatt TL-US, take its weight of 40 kg
 - Use suitable lifting technique when disassembling.
- 5) Remove both safe screws on the left and right side of the Growatt TL-US that attach it to the wall mounting bracket.
 - 6) Handling up the Growatt TL-US slowly.
 - 7) Two people must transport the Growatt TL-US using the side handles at both sides.

8.2 Packaging the Growatt TL-US

Pack the Growatt TL-US. Use the original packaging or packaging that is suitable for the weight and dimensions of the inverter.

8.3 Storage

Store the Growatt TL-US in a dry place. The ambient temperature must be between – 40°F (– 40°C) and +140 °F +60°C).

8.4 Disposal

Dispose of the Growatt TL-US in accordance with the disposal regulations for electronic waste that apply at the installation site.

9 Trouble Shooting



DANGER

Normally grounded conductors may be ungrounded and energized when a PV Isolation Low is indicated.

- Risk of electric shock
- Test before touching
- Work on the Growatt TL-US must be carried out by qualified personnel.

The system status is identified through warning or error signals displayed on the LCD display and the LED. The following tables briefly describe the two types of signals which may be displayed.

9.1 Warning

Warnings identify the current status of the Growatt TL-US. Warnings do not relate to a fault. When a Warning appears in the display, it indicates a warning message and is usually cleared through an orderly shutdown/re-set or a self corrective action performed by the inverter. See the Warning Message in the following table.

| Warning message | Description | Suggestion |
|------------------|--|--|
| No AC Connection | No utility grid connected or utility grid power failure. | 1. Check AC wiring, especially the ground wire 2. Contact Growatt. |
| AC V Outrange | Utility grid voltage is out of permissible range. | 1. Check grid voltage. 2. If the error message still exists despite the grid voltage being within the tolerable range, contact Growatt. |
| AC F Outrange | Utility grid frequency out of permissible range. | 1. Check grid frequency. 2. If the error message is displayed despite the grid frequency being |
| | | within the tolerable range, contact Growatt. |
| Over Temperature | Temperature outrange | 1. check the inverter operation state 2. If the error message is displayed still, please contact Growatt. |

| Warning message | Description | Suggestion |
|------------------|-----------------------------------|---|
| PV Isolation Low | Insulation problem | 1. Check if panel enclosure ground properly. 2. Check if inverter ground properly. 3. Check if the DC breaker gets wet. 4. If the error message is displayed despite the above checking passed, contact Growatt. |
| Output High DCI | Output current DC offset too high | 1. Restart inverter. 2. If error message still exists, contact Growatt. |
| Residual I High | Leakage current too high | 1. Restart inverter. 2. If error message still exists, contact Growatt. |

If the suggestions do not work, please connect to the Growatt.

9.2 Errors

Errors(E) codes identify a possible equipment failure, fault or incorrect inverter setting or configuration. Any and all attempts to correct or clear a fault must be performed by qualified personnel. Typically, the (E) code can be cleared once the cause or fault is removed. Some of the (E) codes, Error as indicated in the table below, may indicate a fatal error and require you to contact Growatt or replace a new one.

| Error code | Meanings | Suggestion |
|------------|---|---|
| Error: 101 | Communication fault Slave processor can't receive data from Master processor. | 1. Restart inverter 2. If error message still exists, contact Growatt. |
| Error: 102 | Consistent fault. Data received by Master and Slave processor are different. The reason can be utility grid voltage or frequency change frequently. | 1. Restart inverter. 2. If error message appears frequently or error message still exists after replacement, check utility grid. If you require help, contact Growatt. 3. If error message still exists, contact Growatt. |
| Error: 116 | EEPROM fault | Contact Growatt. |
| Error: 117 | Relay fault | Contact Growatt. |

Growatt Factory Warranty 10

| | | |
|------------|--|---|
| Error: 118 | Init model fault | Contact Growatt. |
| Error: 119 | GFCI Device Damage | Contact Growatt. |
| Error: 120 | HCT fault | Contact Growatt. |
| Error: 121 | Communication fault. Master processor can't receive data from Slave processor. | 1. Restart the inverter 2. If error message still exists, contact Growatt. |
| Error: 122 | Bus voltage fault | Contact Growatt. |

Once the internal fan of Growatt TL-US has Error, the inverter will stop working. If the outside fan(s) has Error(s), the inverter still work, but the power it feeds into the grid is limited to the temperature itself.
So, if the internal fan has Error, you should to connect to the Growatt to replace the internal fan, do not replace it by yourself!
If the outside fan(s) has(have) problems, you can replace it(them) by the qualified personnel.

This certificate represents a 10 year warranty for the Growatt inverter products listed below. Possession of this certificate validates a standard factory warranty of 10 years from the date of purchase.

Warranted products

This warranty is applicable solely to the following products:

Growatt 8000TL-US, Growatt 9000TL-US, Growatt 10000TL-US, Growatt 11000TL-US.

Limited Product Warranty

(Applicable under normal application, installation, use and service conditions)

Growatt warrants the above listed products to be free from defects and/or failure specified for a period not exceeding ten (10) years from the date of sale as shown in the Proof of Purchase to the Original purchaser.

The warranties described in these "Limited Warranties" are exclusive and are expressly in lieu of and exclude all other warranties, whether written, oral, express or implied, including but not limited to, warranties of merchantability and of fitness for a particular purpose, use, or application, and all other obligations or liabilities on the part of GROWATT, unless such other obligations or liabilities are expressly agreed to it in writing signed and approved by GROWATT. GROWATT shall have no responsibility or liability whatsoever for damage or injury to persons or property, or for other loss or injury resulting from any cause whatsoever arising out of or related to the modules, including, without limitation, any defects in the modules or from use or installation. Under no circumstances shall GROWATT be liable for incidental, consequential or special damages howsoever caused; loss of use, loss of production, loss of revenues are therefore specifically and without limitation excluded to the extent legally permissible, GROWATT's aggregate liability, if any, in damages or otherwise, shall not exceed the invoice as paid by the customer.

The "Limited Product Warranties" described above shall not apply to, and Growatt shall have no obligation of kind whatsoever with respect to, any inverter which has been subjected to:

- Misuse, abuse, neglect or accident;
- Alteration, improper installation or application;
- Unauthorized modification or attempted repairs;
- Insufficient ventilation of the product;
- Transport damage;
- Breaking of the original manufacturers seal;
- Non-observance of Growatt installation and maintenance instruction;
- Failure to observe the applicable safety regulations
- Power failure surges, lighting, flood, fire, exposure to incorrect use, negligence, accident, force majeure, explosion, terrorist act, vandalism or damage caused by incorrect installation, modification or extreme weather conditions or other circumstances not reasonably attributable to Growatt.

The warranty shall also cease to apply if the product cannot be correctly identified as the product of Growatt. Warranty claims will not be honored if the type of serial number on the inverters have been altered, removed or rendered illegible.

Liability

The liability of Growatt in respect of any defects in its PV inverters shall be limited to compliance with the obligations as stated in these terms and conditions of warranty. Maximum liability shall be limited to the sale price of the product. Growatt shall accept no liability for loss of profit, resultant of indirect damage, any loss of electrical power and / or compensation of energy suppliers within the express meaning of that term.

The warranty rights as meant herein are not transferable or assignable to any third party excepting the named warranty holder.

11 Specification

If the input current supplied by the photovoltaic field connected to the inverter is above the maximum usable value and the input voltage is within the allowed range, the inverter will not be damaged and still work normally.

| | Growatt 8000TL-US | Growatt 9000TL-US | Growatt 10000TL-US | Growatt 11000TL-US |
|--|--|--|--|-----------------------|
| Input data | | | | |
| Max. DC power | 8300W | 9300W | 10350W | 11400W |
| Max. DC voltage | 600V | 600V | 600V | 600V |
| Start voltage | 360V | 360V | 360V | 360V |
| DC rated voltage | 345V @208Vac 379V @240Vac | 345V @208Vac 379V @240Vac | 345V @208Vac 379V @240Vac | 379V |
| PV voltage range | 300-600V @208Vac 345-600V @240Vac | 300-600V @208Vac 345-600V @240Vac | 300-600V @208Vac 345-600V @240Vac | 345-600V |
| MPP voltage range | 300-480V @208Vac 345-480V @240Vac | 300-480V @208Vac 345-480V @240Vac | 300-480V @208Vac 345-480V @240Vac | 345-480V |
| Max. input current | 30A | 33A | 36A | 35A |
| Max. input current per string | 30A | 33A | 36A | 35A |
| Number of MPP trackers/ strings per MPP tracker | 1 / 2 | 1 / 2 | 1 / 2 | 1 / 2 |
| Input data | | | | |
| Nominal AC output power | 8000W | 9000W | 10000W | 11000W |
| Max. output current | 44A @208Vac 38A @240Vac | 48A @208Vac 43A @240Vac | 49A @208Vac 48A @240Vac | 48A |
| AC nominal voltage/range | 208V / 183~229V, 240V / 211~264V | | | 240V / 211~264V |
| AC grid frequency; range | 60Hz / 59.3~60.5 Hz | | | |
| Power factor | 1 | | | |
| THDI | <3% | | | |
| AC connection | two phase | two phase | two phase | two phase |

| | | | | |
|--|--|-----------------------------|-----------------------------|-----------------------------|
| Efficiency | | | | |
| Max. efficiency | 97.8% | 97.8% | 97.8% | 97.8% |
| CEC efficiency | 97% | 97% | 97% | 97% |
| MPPT efficiency | 99.5% | 99.5% | 99.5% | 99.5% |
| Protection devices | | | | |
| DC reverse-polarity protection | yes | yes | yes | yes |
| Input over voltage protection-Varistor | yes | yes | yes | yes |
| DC insulation measure | yes | yes | yes | yes |
| AC short circuit protection | yes | yes | yes | yes |
| Output over voltage protection-Varistor | yes | yes | yes | yes |
| General Data | | | | |
| Diemensions(W/H/D)in mm | 469/746/248 | 469/746/248 | 469/746/248 | 469/746/248 |
| Weight | 40KG | 40KG | 40KG | 40KG |
| Operation ambient temperature range | -25°C ... +60°C (derating above +45°C) | | | |
| Noise emission | <46dB | | | |
| Relative Humidity | 0~95% | | | |
| Altitude | Up to 2000m without power derating | | | |
| Consumption: operating (standby) / night | <5W / <0.5W | | | |
| Topology | Transformerless | Transformerless | Transformerless | Transformerless |
| Cooling concept | Fan cooling | Fan cooling | Fan cooling | Fan cooling |
| Electronics protection rating/connection area | NEMA 3R | NEMA 3R | NEMA 3R | NEMA 3R |
| Features | | | | |
| Display | LCD | LCD | LCD | LCD |
| Interface: RS485/RS232/ Bluetooth/Rf/ZigBee/ WiFi | yes/opt/opt/ opt/opt/opt | yes/opt/opt/ opt/opt/opt | yes/opt/opt/ opt/opt/opt | yes/opt/opt/ opt/opt/opt |
| Warranty:10years/ 15 years | yes/opt | yes/opt | yes/opt | yes/opt |
| Certificates and approvals | UL1741,UL1998,IEEE1547,FCC part 15(class B),CSA C22.2 No.107.1 | | | |

12 Spare Parts and Accessories

If needed, you can order these from Growatt specialty retailer.

| Name | Description | Growatt order number |
|-------------|--|------------------------|
| Fans | Dinternal or outside fans of the Growatt TL-US | Growatt TL-US Fan |
| ShineWebBox | communication data logger | ShineWebBox |
| ShinePano | communication data logger | ShinePano |
| WiFi | Communication interface | Internal WiFi module |
| Zigbee | Communication interface | Internal Zigbee module |

Contact 13

If you have technical problems concerning our products, contact your installer or Growatt. During inquiring, please provide below information:

- Inverter type
- Modules information
- Communication method
- Serial number of Inverters
- Error code of Inverters
- Display of inverters

Shenzhen Growatt New Energy Technology Co., Ltd

1st East & 3rd Floor, Jiayu Industrial Zone, Xibianling, Shangwu Village,
Shiyan, Baoan District, Shenzhen, P.R.China.

Tel: +86 (0)755 2747 1900

Fax: +86 (0) 755 2749 2131

Email: service@ginverter.com

Website: www.ginverter.com